Ex-4

B7

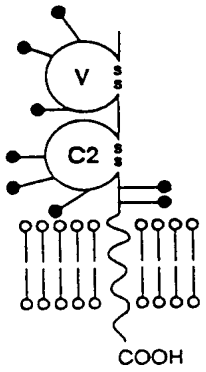
BB1

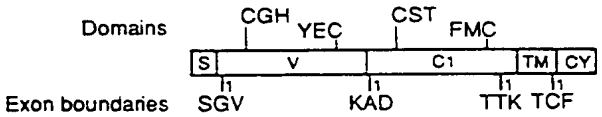
Molecular weights
Polypeptides 30048

SDS PAGE
reduced 60 kD
unreduced 60 kD

Carbohydrate
N-linked sites 8
O-linked unknown

Human gene location and size
3q13.3–3q21; 32 kb [1]





Tissue distribution

Present on a subset of B cells *in vivo* and the majority of B cells activated *in vitro*. Red blood cells, granulocytes, monocytes, resting or activated T cells, thymocytes and platelets do not express B7 [2]. The antigen is expressed by HTLV-I transformed T cells [3].

Structure

The extracellular domain contains two IgSF domains which are highly glycosylated [4]. The sequence of the transmembrane domain is unusual in containing 3 cysteine residues that might be covalently modifed or participate in intermolecular interactions [4] although there is no evidence for this. The cytoplasmic domain has a preponderance (9/19) of arginine residues and contains a potential site for calmodulin-dependent phosphorylation (RRES) [4].

Function

B7 is the ligand for the CD28 [5] and CTLA-4 [6] glycoproteins. Cells transfected with either human [7] or murine [8] B7 genes supply co-stimulatory signals to human T cells, suggesting that the CD28 binding site is conserved [8]. The antigen is not expressed on resting B cells but is strongly upregulated on B cells activated with a variety of agents, including the Epstein-Barr virus [2], cross-linking anti-IgM [2], anti-CD45 and anti-MHC Class II mAbs [9], IL2 and IL4 [10]. MAbs to B7 block the differentiation of B cells into antibody secreting cells [11] and the alloactivation of T cells [9].

Comments

This antigen is not related to a mouse antigen called B7 and to avoid confusion the latter is being called B7(2).

Database accession numbers

	PIR	SWISSPROT	EMBL/GENBANK	REFERENCE
Human			M27533	4
Mouse			X60958	8

Amino acid sequence of human B7

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MGHTRRQGTS PSKCPYLNFF QLLVLA                                    -1
GLSHFCSGVI HVTKEVKEVA TLSCGHNVSV EELAQTRIYW QKEKKMVLTM          50
MSGDMNIWPE YKNRTIFDIT NNLSIVILAL RPSDEGTYEC VVLKYEKDAF         100
KREHLAEVTL SVKADFPTPS ISDFEIPTSN IRRIICSTSG GFPEPHLSWL         150
ENGEELNAIN TTVSQDPETE LYAVSSKLDF NMTTNHSFMC LIKYGHLRVN         200
QTFNWNTTKQ EHFPDNLLPS WAITLISVNG IFVICCLTYC FAPRCRERRR         250
NERLRRESVR PV                                                  262
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References

1 Selvakumar, A. et al., personal communications.
2 Freedman, A.S. et al. (1987) Immunology 139, 3260–3267.
3 Valle, A. et al. (1990) Immunology 69, 531–535.
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5 Linsley, P.S. et al. (1990) Proc. Natl Acad. Sci. USA 87, 5031–5035.
6 Linsley, P.S. et al. (1991) J. Exp. Med. 174, 561–569.
7 Linsley, P.S. et al. (1991) J. Exp. Med. 173, 721–730.
8 Freeman, G.J. et al. (1991) J. Exp. Med. 174, 625–631.
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